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ABSTRACT

A mapping procedure was used to analyze a massive amount of narrative data which was collected from observations of the implementation of an intervention. Mapping is the procedure of locating interventions in relation to one another conceptually, as a map does physically. As the data were analyzed, classifications and groupings of interventions emerged. The steps involved in mapping included: (1) identifying a framework for analysis; (2) reading the data to find actions or events affecting intervention; (3) describing each intervention; (4) placing each intervention on a map (training, support structures, university collaboration, evaluation, dissemination, etc.); (5) placing interventions in relation to each other; (6) listing incidents in chronological order for each strategy mapped; and (7) editing. As a result of this project, several guidelines were developed: understand the effort before starting to map; allot enough time; have two people do the mapping; maintain a constant frame of reference; and protect the confidentiality of data sources. Mapping, in this case, reduced qualitative ethnographic data and contributed toward a theory of intervention. It helped to provide a systematic overview of the implementation effort and pointed out problems associated with the intervention and the ethnographers' data. (GDC)

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A MAPPING TECHNIQUE FOR THE
ANALYSIS OF ETHNOGRAPHIC DATA

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Recently, there has been an increased emphasis on ethnographic data collection, in many types of research. Those who employ ethnographic methods are continually faced with a dilemma: what to do with massive volumes of detailed descriptive material. How can the descriptions be reduced to manageable size without losing their richness or essential information? How can all the information be used to analyze and evaluate what occurred at a field site? How can it be used in the development of theory?

A year ago, the authors and their associates found themselves burdened with thirty volumes of unanalyzed descriptive data about the implementation of a new approach to discipline at a junior high school. These data had been collected for use in the development of a theory of intervention in the implementation of change. The process of theory development was at a point where the ethnographic

¹The research described herein was conducted under contract with the National Institute of Education. The opinions expressed are those of the authors and do not necessarily reflect the position or policy of the National Institute of Education. No endorsement by the National Institute of Education should be inferred.

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data had to be accessed. It seemed fruitful to try to reduce and organize the data into outline form that would parallel the evolving theory of intervention. The word "map" was chosen to describe this analytical data reduction procedure because it locates interventions in relation to one another conceptually as a map does physically.

The purposes of this paper are to describe this mapping procedure for ethnographic reduction and analysis and to discuss its other uses. The presentation will trace the development of the technique, its systemization and refinement, current procedures and guidelines for effective use, and ways in which the map has been and might be used. We also discuss the contributions the mapping technique has made to the development of a theory of intervention. Finally, we speculate on how the intervention mapping technique can be used to analyze and evaluate organizational change efforts and to check on the completeness, validity, and objectivity of the ethnographer's documentation.

A. Development, Systemization and Refinement of the Mapping Procedure

1. Context/Frame of Reference

When work on the mapping procedure began the research staff had twenty-three volumes of narrative description, or protocols, which documented events at one field site during the first year of an implementation effort. The purpose of the data collection had been to collect information about interventions, which the research staff defined as actions or events which influence use of an innovation. Five categories, or levels, of interventions had been proposed at the outset:

Policy: A rule or guideline that reflects, directs, and legitimizes goals, procedures, decisions, and actions of the organization and individuals within the organization.

Game Plan: The overall design for the interventions that are taken to implement the innovation.

Strategy: An interrelated set of interventions involving a large portion of the change effort that translates assumptions and theory about how people and organizations change into action.

Tactic: An aggregation of incident interventions that in combination have an effect that is larger or different from the effects of individual incidents.

Incident: The singular occurrence of an action or event.

These preliminary definitions and descriptors of each of the levels of intervention were being developed in research staff meetings when the authors were given the task of identifying a sample of interventions to exemplify each level, (Hall, Zigarmi, & Hord, 1979).

2. Initial Steps in the Development of the Mapping Procedure

In order to identify a sample of interventions, we began reading the protocols in sequence, listing interventions as we came to them. We worked together, trying to reach consensus in each case as to what actions or events were interventions and which were not. While making the list, we sorted the interventions according to whether they seemed to be incidents, tactics, strategies, game plans or policies. When we first began, we listed the interventions on large computer printout sheets, connecting related interventions by boxes and arrows.

Because we sensed that the research staff might find it more useful to have groups of similar interventions to analyze, we began to explore ways of grouping systematically. Interventions were grouped 1) by source (i.e., all of the interventions initiated by the principal in support of the innovation); 2) by function (i.e., training); or 3) by location (i.e., during team meetings). Later, groupings were made primarily on the basis of function, and secondarily by source.

Two months after we began this task, we reported to the entire research staff on our progress. Our work had given us insights into the characteristics

of an intervention and clues for distinguishing one level of intervention from another. The decision was made to formalize some of the guidelines we had been using in mapping. In turn, other rules for the selection and classification of interventions evolved as our sense of what an intervention is was clarified in research staff meetings.

3. Systemization and Refinement of the Mapping Procedure

As we continued to work over the next three to six months, we became much more systematic in recording and grouping interventions. For example, we used separate computer printout sheets for each strategy, listing its related tactics and incidents on the same page. We also decided not to list single actions or events in more than one place on the map, but rather to group them with related interventions. Thirdly, we found it was crucial to keep our frame of reference constant. Because of the research project's long-term interest both in developing a theory of intervention and in providing assistance to change facilitators in the selection of appropriate interventions, it seemed crucial to construct the map from the change facilitators' point of view. At times, we were tempted to describe what was happening from the users', outsider's or ethnographer's point of view, but these actions didn't seem to fit with the change facilitator's game plan and strategies. In fact, the change facilitators were often uninvolved or unaware of these other actions.

As we continued to map, we came across several actions that seemed to have important, although unintended or unanticipated, effects on the implementation effort. Two examples follow. In one instance, the continual tension that characterized interactions between the principal of the school and the project director began to have a serious effect on the morale of the project staff. This tension, we felt, could potentially affect the outcomes of the entire

change effort. In another instance, incidents related to the casual appearance and more liberal lifestyle of the on-site change facilitator in the particular project we were researching seemed to affect teachers' attitudes toward and, consequently, their use of the innovation. As the list of examples like this lengthened, we began to identify groups of incidents that had a collective and obvious impact on the change effort. We felt that these actions had to be taken into account in building a theory of intervention. Because these actions did not seem to fit with any of the already-identified levels of intervention and because they were not sponsored by anyone responsible for the change effort, a new level of intervention called "themes," was proposed. Eventually, the research team, working with our examples, defined a theme as "a set of actions or behaviors occurring over time, characterized by a common tone or stance, that has unplanned, cumulative effects on the implementation effort and/or use of an innovation."

Throughout the first several months, as the mapping procedure was being developed, the authors always worked together in identifying and classifying interventions. However, because mapping was so time-consuming and because our reliability in identifying interventions was increasing, we decided to attempt to work separately to identify interventions to be mapped. The interventions we individually identified were then typed before we met to discuss them. When we got together, we considered each intervention to decide where it substantively fit on the map in relation to other interventions and at what level, (i.e., incident, tactic, strategy, etc.) it belonged.

4. Revision of the Map

Once we had completed the map, we went back to review our work. First, we decided if we had placed interventions at the right level. Then we reviewed

each intervention description for completeness and filled in missing data, particularly dates. Finally, we reworded the intervention descriptions into the present tense. Once we had edited the whole map and reduced it to letter-size paper, we documented and revised the procedures we had used to produce our final product. These procedures are described in the next section of this paper.

B. Current Mapping Procedures

For researchers interested in reducing and analyzing ethnographic data, the first step in mapping is 1) to identify a framework for analysis. We used our research project's concept and definition of interventions and levels of intervention as our framework for analysis. In other projects another framework may be applicable.

Secondly, 2) read through all of the ethnographic material and list any action or event you feel could potentially affect use of the innovation. At this point, don't attempt to classify interventions by levels, (i.e., incident, tactic, strategy, game plan, policy.) Because we felt we had to limit the number of interventions we identified in order to reduce the data, we devised a number of rules for use in deciding what was and was not an intervention. For example, regularly-scheduled meetings would not be listed as interventions; instead, important decisions or interventions that occurred during these meetings would be listed as interventions. Furthermore, actions that only indirectly or minimally influenced implementation would not be considered interventions. Random comments about the innovation which do not enhance or detract from the implementation effort are not interventions, whereas positive or negative feedback about the innovation to or from users, change facilitators, or decision-makers is an intervention. Comments made to or by the ethnographer are also not interventions, although they may help identify interventions.

Furthermore, conditions and feelings are not interventions because they cannot be considered "actions" or "events." Finally, if a routine strategy or tactic is established, only a break in the routine would be recorded as a further intervention. These rules were helpful to us and other members of our research staff in identifying interventions. You may find you need to work out guidelines for your purposes.

The third step in using the mapping procedure is 3) to write a one or two sentence description of each intervention. You should include information about the source, the target, and function or purpose of the intervention. Each description should include a reference to the location where the event or action occurred. In our descriptions of interventions, we used adverbial phrases to show whether the action occurred once or was repeated and we tried to indicate how much time the intervention encompassed, its duration. Also, for consistency, intervention descriptions were written in the present tense.

The fourth step in the mapping procedure is 4) to have the intervention descriptions typed on individual slips of paper so that they can be separated and sorted. At the same time, the people who are doing the mapping need to get an overview of the change effort in order to identify functionally-related components of the change facilitator's game plan. This can be done by reading descriptions of the project, talking with the change facilitators themselves or other persons who have first-hand knowledge of the change effort, or by reading a good portion of the narrative ethnographic data before beginning the grouping process. The intervention descriptions, once typed, are then sorted by game plan component.

The next step in the mapping procedure is 5) to decide where to place each intervention on the map, taking into account the definitions and descriptors of levels which are part of the theory of intervention and the relationship of a

particular intervention to other interventions in a game plan component. In the implementation effort we were analyzing, five game plan components were tentatively identified: (1) training, (2) the development of other support structures, (3) university-public school collaboration, (4) evaluation, and (5) dissemination. Once several game plan components of the implementation effort are identified, the next task is 6) to decide where to place each intervention in relation to other interventions. We found it was helpful to identify strategies in relation to each game plan component first and to tape each on a separate large sheet of paper. Examples of strategies we identified in our analysis of the ethnographic data we were working with were: (A) The change facilitators work with individual users on use of the innovation (duration of the project); (B) The change facilitators meet weekly with groups of teachers during planning periods to develop their skills and effectiveness in use of the innovation (duration of the project); (C) The junior high school principal promotes and supports use of the innovation (duration of the project).

Our next step was to list incidents related to each strategy in chronological order on the appropriate strategy sheet. Incidents related to Strategy C above include:

1. At the end of the faculty meeting on December 1, the principal gives the teachers a pep talk on the innovation.
2. During a team meeting on September 28, the principal demonstrates use of the innovation with an individual student.
3. The principal meets with one teaching team on September 28, 1976, to find out how they are feeling about the innovation.
4. The principal suggests that one teacher work with another teacher on improving her use of the innovation, April, 17, 1977.
5. The principal initiates a conversation with several faculty members in the lunchroom (September 10, 1976), describing her use of the innovation with one particular student.

In the implementation effort we were analyzing, it was easier to nail down strategies and incidents and later infer related tactics and themes. In other change efforts, tactics may be more explicit and strategies might have to be inferred. In either case, once one level is grounded, other levels can be identified in relation to this level. Once we had identified strategies and incidents, we then looked for tactics or groups of related incidents that in combination had an effect that was larger or different from the effects of individual incidents. Examples of tactics we identified in relation to Strategy C are listed below:

Strategy C -- The junior high school principal promotes and supports use of the innovation (duration of the project).

Tactic 1 -- The principal confers with individual teachers about the problems they are experiencing in using the innovation (September, 1976 - November, 1976).

Tactic 2 -- On several occasions the principal demonstrates use of the innovation with students while faculty members observe (first month of project).

Tactic 3 -- The junior high school principal uses teachers' use of the innovation as a criterion for teacher evaluation (November, 1976; May, 1977; and April, 1978).

Tactic 4 -- The junior high school principal describes her successful experiences in using the innovation with students and her positive attitudes toward the innovation with teachers (Fall, 1976).

Once strategies, tactics and incidents were identified and grouped together on separate sheets of paper, we tried to identify themes by looking at groups of incidents that were not intended to affect, but did affect the implementation effort. We found that themes were sometimes related to more than one game plan component, strategy or tactic. For each theme we identified, we wrote a description of the theme and listed the incidents related to that theme on a separate sheet of paper. Each theme was then referenced to the specific game plan, strategy(ies), or tactic(s) to which it was related. We used the same procedure to record policies. Each policy was described on a separate sheet of

paper. It included a reference to the specific game plan(s), strategy(ies), or tactic(s) that it was most closely identified with. In the following example, "university policy prohibits the project from hiring an outside consultant to train faculty members in a technique to improve communication with their students by establishing an upper limit on the total amount of compensation any one consultant can receive, (I, F and G-5). The Roman numeral I refers to Game Plan Component I, while the F and G refer to specific strategies, and the Arabic number 5 to a specific tactic. Policies, we found, could be identified by an actual reference in the ethnographic data, by inference from reading through the map as it was being constructed, or by reading through other relevant documents (i.e., lists of school board policies faculty handbooks, student handbooks, etc.).

After identifying all of the interventions, the last step in the mapping procedure is 7) to edit and revise the map. A number of questions can be raised at this point in the mapping process. Are all of the strategies for each game plan component included in the map? Are all of the tactics included? Isolated incidents that are not easily grouped with existing strategies, tactics, or themes are a clue that not every strategy or tactic has been identified and that new strategies or tactics should be inferred. In a few cases, we came up with new strategies, tactics, or themes under which several of these random incidents could be placed.

At this point in the mapping procedure, we made a list of all of the strategies and tactics we had identified for each game plan component. Game plan components were coded with Roman numerals; strategies with capital letters; and tactics with Arabic numerals. We also made sure that tactics and incidents were listed in chronological order under the strategies they were related to. This often meant recutting, resorting, and retaping interventions from several

sections of the map on new sheets of paper. As we edited, we also reconsidered whether each intervention was grouped with the most appropriate game plan, strategy or tactic since it was decided that it would only appear on the map once. Once editing is completed, 8) have the whole map retyped on 8-1/2 by 11" sheets. At the same time, 9) develop a table of contents for each game plan component (See Figure 1).

At this point, the persons responsible for mapping may also want to make a visual posterboard representation of the map since the map itself is a large document. Such a representation might be constructed for each game plan component, displaying its related strategies and tactics along a time line representing the length of the implementation period. Figure 2 shows what a map might look like. A visual representation has some advantages in that it enables others to quickly see the relationship of various tactics and strategies to each game plan component. It also allows the viewer to see the chronological relationship of one event to another. On the other hand this temporal relationship may be overemphasized in a visual representation when it is relatively less important than other factors such as the number of persons affected by the intervention, the amount of time encompassed by the action, and the relative scope of the intervention, which are all included in the written map. If a visual representation is constructed, this change in emphasis should be pointed out.

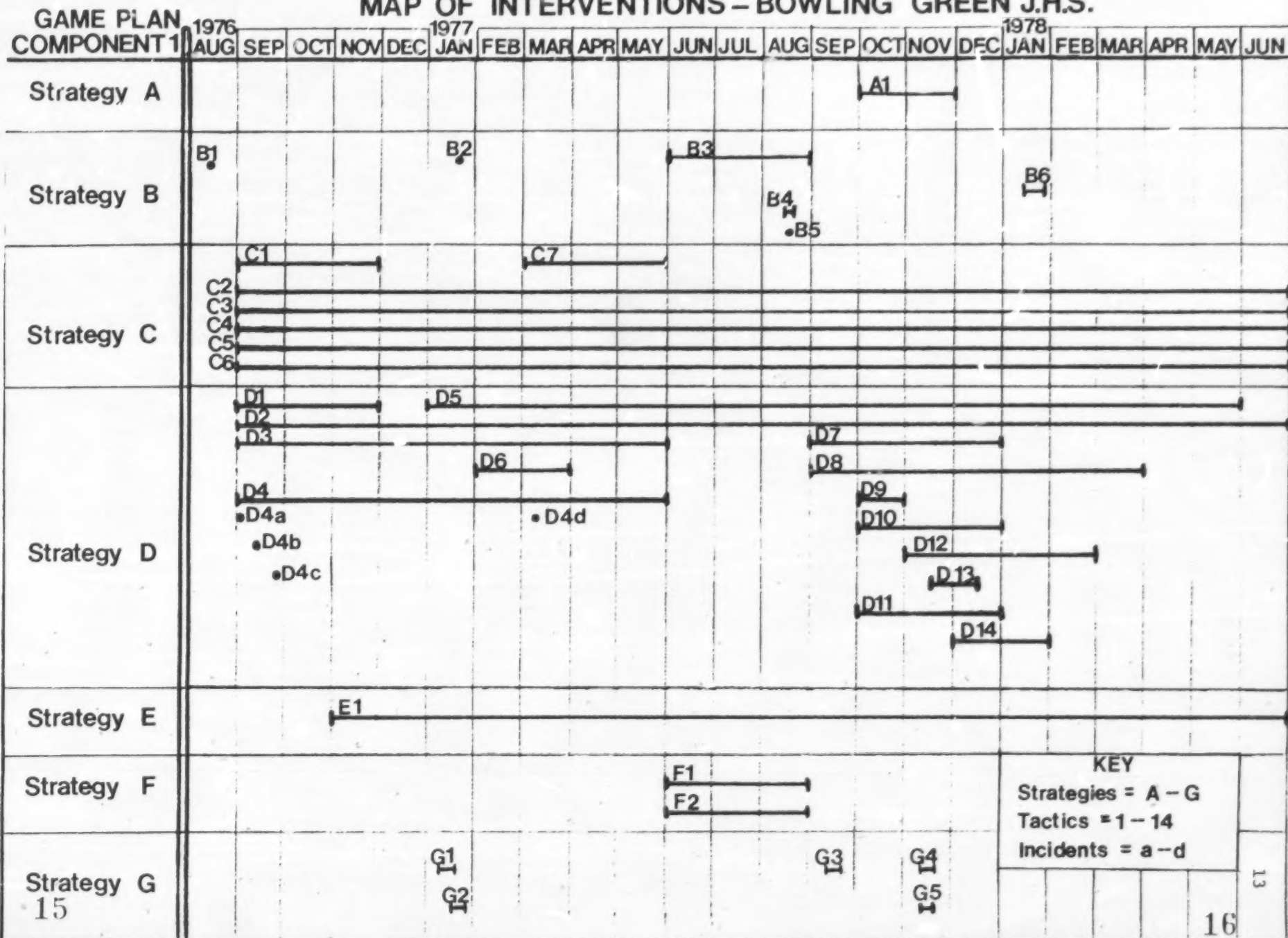
C. Guidelines for Effective Use of the Mapping Technique

From our experience and those of our colleagues with another set of ethnographic data, several guidelines for the effective use of the mapping technique can be identified. These are described under the topical headings:

Figure 1
Example of Table of Contents

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MAP OF INTERVENTIONS – BOWLING GREEN J.H.S.



Starting Point, Time Involved, Criteria for Choosing Who Does Mapping, Frame of Reference, and Anonymity.

Starting Point

We feel it is important for researchers who use the mapping procedures we have described to have a sufficient overview of the entire implementation effort they are analyzing before beginning. The overview will help the researchers doing the mapping initially identify game plan components and key strategies and tactics and, ultimately be more efficient. We did not start mapping until the beginning of the second year of the change effort we were studying.

Time Involved

Sufficient time should be allotted for the task. To map a two year implementation effort, (over 30 volumes/1200 pages of qualitative ethnographic data), it took us one year with two people meeting two days a month together and working two days a month separately.

Criteria for Choosing Who Does Mapping

We feel it is important that mapping be done in pairs in order to increase the reliability of intervention identification and placement. There are a number of advantages to involving the ethnographer in mapping, if it is possible. In the first place, it is easier to sort out the cast of characters and to get a better sense of the whole implementation effort if the ethnographer is involved. Secondly, there is greater access to missing information; and, thirdly, it is easier to verify the purposes or functions of actions when intentions are only implied in the narrative descriptions. On the other hand, there may be an offsetting disadvantage to involving the ethnographer in the mapping activity in

that the ethnographer's preconceived notions or evaluation of what happened at the field site may bias the selection and placement of interventions.

If the ethnographer is not involved in the mapping activity, those doing the mapping should read a large portion of the narrative descriptions of the implementation effort before beginning to work on the map, in order to identify game plan components and major strategies. If the ethnographer is available, it might be helpful to have him or her write an overview of the change effort from his or her perspective to aid in this identification process. The ethnographer might also be asked to review the map once it is constructed but before it is edited to revise or fill in missing information.

Frame of Reference

Once again we want to emphasize how important it is to keep the frame of reference constant if the map is going to be useful in data analysis. In our case, we chose the perspective of the change facilitators (all those directly responsible for administering the change effort), recognizing that maps we might have constructed of the same implementation effort from the user's or the ethnographer's point of view might be quite different.

Anonymity

For some purposes, maps of implementation efforts may be more valuable if the people who are named as sources and targets of interventions are identified by role or position rather than by name. In our case, this technique was valuable because maps of different change efforts could then be compared and data could be aggregated. It may also be easier to analyze and evaluate a particular implementation effort if the map is not so personalized. Finally, anonymity protects the confidentiality of the data.

D. Uses and Potential Uses of the Map

Clearly the reduction of qualitative ethnographic data is one use of the mapping procedure. In this project, it also contributed to building a theory of intervention in that it helped research staff identify and analyze interventions and their characteristics. Work on the map also increased our awareness of what information was needed to describe an intervention (i.e., source, function, target, date; and a noun and predicate). Furthermore, the map provided us with a pool of interventions that the research staff has and continues to use in tasks such as sorting and classifying. These activities have helped us refine our project's concept of what an intervention is and our definitions of levels of interventions. Specifically, by doing the mapping we learned that the placement of interventions is relational and that duration or amount of time an intervention takes is relatively less important than we originally thought, clearly less important than other factors (e.g., the operational relationship of one action to another) for deciding the level placement of an intervention. Finally, the mapping technique helped us identify the need for another level of intervention, i.e., "themes", and thereby contributed to our building a theory of intervention. Up until this time, these kinds of actions which have unplanned or unanticipated effects on the implementation effort have largely been ignored in the literature on "planned" organizational change.

Other Uses of a Map

Two uses of a mapping procedure have been described in this paper. A map is a useful way for researchers to reduce qualitative ethnographic data and, in our case, the map also contributed to building a theory of intervention. In addition, the map gave us a systematic overview of the entire implementation effort which helped us understand, analyze, and evaluate the specific

implementation process the research staff was studying. The map pointed out where the "holes" were in the change facilitators' planning. It also made us aware of times when plans were not carried out and of situations where inconsistencies existed between two plans or between plans and actions (e.g., between two conflicting strategies or tactics or when policies were in conflict with strategies). Researchers in other settings, such as individual classrooms, might consider using the mapping technique for these purposes.

A map also gives the research staff a check on the completeness of the ethnographer's documentation. From our analyses, we became aware of the frequency or number of incidents recorded in relation to each strategy and tactic. Consequently, we could identify where the ethnographer focused most and least attention, and, therefore, could better assess her biases and emphases.

As has already been mentioned, a map reduces ethnographic data; it makes qualitative data more manageable and accessible. Because a map is an outline of an entire change effort, the research team can pick out separate pieces for further analysis and still see the relationship of the parts to the whole. Furthermore, a map objectifies ethnographic data to some degree. In constructing a map of the implementation effort we were studying, we weeded out the ethnographer's opinions, analyses, and evaluation of what happened as much as possible from the interventions themselves. Additionally, we found it was possible to construct a time line or visual representation of the change effort from the map which could be compared with quantitative measures administered over the course of the implementation period. Other staff members have suggested that critical incidents which had a significant impact on the direction and flow of the implementation effort could easily be identified when the map was transferred from written form to chart form.

Finally, because of the time we spent mapping, we became aware of the kinds of information that would be helpful to have ethnographers collect and report in future ethnographic studies of change efforts. It seems to us that a map of a similar change effort to the one the ethnographer is assigned to observe could be used to train the ethnographer in the techniques of ethnographic data collection and reporting.

Limitations of the Mapping Technique

Clearly, the mapping procedure described in this paper was useful to this research project in that it helped reduce volumes of ethnographic data, contributed to the development of a theory of intervention, provided a check on the completeness and quality of the ethnographer's documentation, and shed light on the whole process of ethnographic data collection and analysis. Despite its usefulness, the procedure has many limitations. For example, a map is less rich than a case study where the author can present various points of view, infer the reasons for meanings of certain actions, and include direct quotations and illustrative detailed anecdotes. Furthermore, he/she can speculate, interpret, and hypothesize about why things happened the way they did.

A map can only be what it is by definition -- a description of how actions or events are related. It is an outline or an X-ray, a tool to get at the skeletal framework of a change effort. It reduces detailed ethnographic notes to one-tenth their size, but it is not prescriptive and cannot tell a researcher or change facilitator how to plan interventions or whether or not a group of interventions will have the effects that are intended. A map can generate hypotheses, but, unlike a case study, these opinions or judgements are not recorded as part of the map. The value and limitations of the mapping procedure should be borne in mind by anyone who is considering using this technique so

that the most appropriate tool for analyzing and reporting ethnographic data can be chosen.

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